



laetus in praesens

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Complementarity and Self-Reflexivity between nuclear fusion and cognitive fusion

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Annex A of [Enactivating a Cognitive Fusion Reactor: Imaginal Transformation of Energy Resourcing \(ITER-8\)](#)
[See also website of [ITER-8: Cognitive Fusion Reactor](#)]

Summary

Background

EXPERIMENTAL CHALLENGES

- Experimental challenge of fusion for ITER
- Experimental challenge of "cognitive fusion" for ITER-8

COMPLEMENTARITY AND SELF-REFLEXIVITY (Annex A)

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DEMATERIALIZATION AND VIRTUALIZATION (Annex B)

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- Complementary fusion metaphors: "plasma dynamics" and "attention dynamics"
- Towards a language appropriate to dynamic engagement
 - Form and dimensionality | Embodiment | Didjeridu playing
- 3-fold Complementarity (nuclear fusion, didjeridu, cognitive fusion)
- Helical threading of "incommensurables"
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 - Supercoiling and field effects in cognitive organization (of knowledge)
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CONCLUSION

References

Complementarity between ITER-8 and the ITER fusion project

The reservation above regarding the parallel between the "burning plasma" and "burning attention" processes, as necessary to any form of "fusion", is fundamental to any understanding of the distinctive methodology of ITER-8 in contrast with ITER. Whilst both are focused on "fusion", ITER-8 is necessarily far more open to "cooler" approaches. Without necessarily seeking parallels to "cold fusion" possibilities, ITER-8 might be fruitfully understood as exemplifying "**cool fusion**" in terms of the distinction drawn by McLuhan. ITER-8 seeks to benefit from the insights most capable of engendering psychosocial energy sustainably. The sophisticated thinking and modelling incorporated into the design of the fusion processes of ITER are therefore a rich source of insight to fuel the design processes and implementation of ITER-8. But other sources may also prove valuable.

Of necessity, ITER-8 can have no conventional formal relationship to the complementary preoccupations of ITER. "Formal" is here to be understood as a descriptor in the standard project logic of conventional legal, financial and other arrangements. Nor is ITER-8 to be

understood as an "alternative" or "shadow" lobby -- now typical of many intergovernmental initiatives and conferences (eg [TOES: Toward Another Economic Summit, World Social Forum](#), etc).

However, irrespective of the absence of contacts of this form, ITER-8 maintains a close "formal" relationship with ITER in the following senses:

- **Mirroring:** ITER-8 mirrors and reflects the conceptual and technical design challenges of ITER within a psychocultural framework or container. Mathematically and cognitively this might be understood in terms of "conformality" (cf [Conformality of 7 WH-questions to 7 Elementary Catastrophes](#), 2006)
 - ITER-8: In contrast to the highly critical "ITER Watch" pattern that typically emerges in response to other intergovernmental initiatives (eg [UNWatch](#), [World Bank/IMF Watch](#), [OECD Watch](#), etc) or corporate initiatives ([Corporate Watch](#), [Davos Watch](#), etc), ITER-8's "critical" observation of ITER is entirely focused on eliciting new insights of value to engendering psychosocial energy through new forms of psychosocial organization. In effect it is a psychosocial simulation -- in cognitive terms -- of the energy management processes of ITER. The mirroring may also be understood:
 - in terms of the football metaphor of "marking" members of the opposing team or
 - in the light of the term "[syzygy](#)" (meaning "yoked together") as used by Carl Jung to denote an archetypal pairing of opposites symbolic of the communication of the conscious and unconscious minds, of animus and anima.
 - ITER: From an ITER-8 perspective, ITER could be considered as the most comprehensive simulation of the operation of the processes of consciousness under dynamic conditions. It is the template of requisite variety by which the challenges cognitive fusion can be modelled. These have every possibility of corresponding to those reportedly associated with "creativity", "inspiration" and "illumination". This can be considered a significant contribution to artificial intelligence and understanding of the future operation of some form of "global brain" (cf [Simulating a Global Brain: using networks of international organizations, world problems, strategies, and values](#), 2001). In contrast with many other simulations of the brain, the quantum mechanics of ITER, in terms of which the simulation is defined, offers both a degree of objectivity as well as a non-mechanistic dimension that may better reflect the dynamics of consciousness (cf resources on [quantum mind](#) theories).
- **Powerful metaphors:** To the extent that the realization of ITER is a challenge to conceptual creativity, potentially dependent on design breakthroughs based on the discovery of more powerful generative metaphors, ITER-8 is designed to elicit more powerful metaphors that are also:
 - facilitative of the kind of lateral, "out-of-the-box" thinking fundamental to the success of both ITER and ITER-8
 - potentially enabling with respect to the ITER fusion project, and in this sense every single technical challenge of ITER is understood to have a metaphoric complement that may be reframed through common metaphors of relevance to ITER-8
- **Isomorphism:** In terms of systems thinking, notably that previously the focus of the [Society for General Systems Research](#), there are patterns of relationships common to the design principles and processes of ITER and ITER-8. These can be understood as isomorphic and as such offering opportunities for the transfer of knowledge and insight between them
- **Faith-dependence:** ITER and ITER-8 have complementary relationships to the "objective" and "subjective" decision processes from which they emerged:
 - ITER: has emerged as the result of a "faith-based" assessment by politicians, advised by scientists -- themselves acting on their own form of "faith", in the absence of certainty, regarding the results of further experiment as suggested by past fusion experiments (cf [Fusion Dreams](#), 2002; [UK spearheads world search for 'dream energy' of nuclear fusion](#), 2002; [France clings fusion dreams](#), 2004). Given the time envisaged for completion of experimental work at ITER, and the resources that will be required from the "faithful" until 2050, the challenge of completing the project may possibly be compared with that of the construction of the [Basilica of St Peter](#) in Rome and the resources acquired to that end (through the "[sale of indulgences](#)" to the faithful) [[more](#)]. Faith-dependence is also evident in the comparison with the only other research project requiring more research funds than ITER, namely the [International Space Station](#) project formally initiated in 1993. Throughout the 1990s, construction delays hit the project, budget projections were heavily revised and the ISS structure was modified frequently. The ISS has been far more expensive than originally anticipated despite continuing budget cuts. The overall cost from the start of the project in the late 1980s to the prospective end in 2016 to be in the region of €100 billion. By then it will be only a shell of the project as originally envisaged [[more](#)]
 - ITER-8: has emerged in response to "faith" in the potential of ITER -- but in the light of the experientially-based practices of millions over centuries, reinforced by "faith-based" judgements.
- **Societal mega-project:** To the extent that a reframing of their relationship is called for, ITER and ITER-8 are effectively, in the following sense, the cognitive extremes of one of the most challenging societal projects of humanity:
 - **together** they exemplify the incommensurability of polarized thinking that is undermining coherent approaches -- of adequate complexity in a systemic sense -- to the condition of the planet. This can be variously described as the "[two culture problem](#)" (fed by interdisciplinary prejudices) or the "[clash of civilizations](#)" (fed by religious prejudices) that results in disorderly, uncreative violent interactions of painful consequences to many. More fundamentally it relates to the subject/object distinction (cf Max Deutscher, *Subjecting and Objecting: an essay in objectivity*, 1983) and to the challenges highlighted by enactivism (cf George Lakoff and Mark Johnson, *Philosophy in the Flesh: the embodied mind and its challenge to western thought*, 1999). Curiously there is increasing reference to the "fusion" of science and religion
 - "We are entering the greatest era of science-religion fusion since the Enlightenment last attempted to reconcile the two, three centuries ago" (Gregg Easterbrook, *The New Convergence*, *Wired*, December 2002)

may be related to some form of "intensity" corresponding to a degree of interactivity -- in this case of psychic processes, perhaps to be understood in terms of degree of awareness or consciousness.

In this sense "heat" may be a misconception regarding the desirable outcome involving "creativity", "insight" or "illumination". **The primary outcome sought in ITER-8 may then be understood as "light"** -- as a source of insight. "Heat" (as in "heated discourse") may be a somewhat regrettable by-product of "work" (however necessary the "heat" may be in terms of "psychic thermodynamics"). In western traditions, the "degrees" required for such "work" may perhaps be usefully compared with academic "degrees" or the "degrees" of freemasonry (as restricted to men) -- rising to a maximum of 32 in one tradition. This suggests the existence of a limit condition (although it may be speculated that a complementary set of 32 degrees is open to women). The exponent of 8 (as in 10^8) has been used in the acronym of ITER-8 as an indication that the interactive "intensity" required for fusion may be differently assessed and comprehended in the case of ITER and ITER-8. **The interactivity associated with such intensity may, in the case of ITER-8, be more intimately associated with the degree of self-reflexivity and self-reference -- the degree of curling in "cognitive space time"** (analogous to that hypothesized as the dimensionality of spacetime within various flavours of [string theory](#)). This dimensionality may be usefully reflected in the various psychocultural understandings of "initiation" and "rebirth" (cf *Varieties of Rebirth: distinguishing ways of being "born again"*, 2004). Does the succession of academic degrees imply a progression in degrees of self-reflexivity appropriate to the cognitive fusion enabling "profession"? The contrasting implications of "cold fusion" await the results of the continuing (controversial) research in this area.

- **Appropriate containment:** in both cases a highly unusual form of "container" is required:
 - ITER: the container design for fusion reactors has focused in recent years on magnetic confinement to ensure that the heated plasma does not become quenched by any contact with the walls of the container, which would both inhibit the process and damage the container, possibly irreparably. The design must ensure that the plasma can be maintained long enough for the desired reactions to occur. A much studied form, adopted by ITER, is the tokamak torus. Different configurations of magnets have been proposed and continue to be tested.
 - ITER-8: the cognitive "containers" variously advocated by different disciplines and spiritual traditions typically involve from 6-12 differently oriented, distinct elements or modalities (precepts, principles, commandments, core values, "ways", etc) (cf *Navigating Alternative Conceptual Realities: clues to the dynamics of enacting new paradigms through movement*, 2002). For example:
 - in the *I Ching* of Chinese Taoist tradition, 8 "houses" are distinguished through which change occurs.
 - the Buddhist Eightfold Way is especially suggestive of a minimum pattern of necessary pattern through which to achieve and sustain illumination
 - the 9 types of the enneagram (cf Anthony Blake, *The Intelligent Enneagram*, 1996) -- notably used as the basis of the Rodin coil [[more](#) | [more](#)]
 - mandala structure with sectoral orientations functioning like attractors (magnets)

Corresponding to the constraining field effect provided by the superconducting magnets of ITER, in ITER-8 these modalities may be understood to function like constraining strange attractors (*Human Values as Strange Attractors: Coevolution of classes of governance principles*, 1993). In the case of ITER, the number exceeds 7, further justifying the use of 8 has been used in the acronym of ITER-8. Another parallel to be explored is between the various magnetic field containment systems for plasma (see [alternative confinement concepts: stellarator, reversed-field pinch \(RFP\), field reversed configuration \(FRC\), spheromak, levitated dipole](#)) and the various approaches to managing attention meditation..

Any such container for the "universal solvent" (in alchemical terms) depends on the ability to ensure that dysfunctional loss of concentration and shifts in attention (awareness or psychic energy) are constrained by one or more of the distinct elements. Together they prevent the quenching of attention through inappropriate contact with "mundane" matters in order that the desired "reaction" can occur. If any one of the constraining modalities is poorly synchronized with the rest it will inappropriately attract or repulse attention in such a way as to destabilize the whole -- possibly disastrously. It can be appreciated why the advocates of particular religions are so adamant at the need to respect what may allow their followers to achieve "illumination" or "transfiguration" of some kind. The problem however is that the very dogmatism associated with such disciplines may well ensure that these modalities themselves become quenching factors for inspiration. Unlike the case of ITER, use of the term "reaction" may frame the challenge much less fruitfully than if "proaction" or "enaction" were to be used.

These considerations indicate the possibility of projecting or mapping religious "templates" onto ITER as a form of "test bed" to increase understanding of the functional role of sets of precepts in appropriately controlling consciousness. In addition to a container defined by "modalities", there are also implications to be considered for the design of a meeting environment as a container within which such modalities would be active in constraining and focusing attention.

- **Stabilizing dynamics:** Both ITER and ITER-8 share the challenge of stabilizing the dynamics of the flows within which fusion is to be engendered:
 - ITER: The dynamics of plasmas in relation to various approaches to their confinement has been the subject of extensive research. Electrons and ions gyrate (with a radius of millimetres) around the magnetic field lines that serve in part to prevent contact with the container wall. Part of the difficulty of stabilizing the dynamics is due to the fact that when electrons and ions move, they themselves produce magnetic fields -- and when they drift apart they engender electrical fields. The particles are therefore moving in magnetic and electrical fields partly generated externally (by imposed fields) and partly as a result of the movement of all the other particles (as self-consistent fields). Instabilities develop in confined

magnetic plasmas. This creates turbulence which is responsible for much of the heat transported out from the plasma core. A major difficulty in understanding such transport phenomena is the disparity in scales between the ion gyration radius (in millimetres) and the distance covered before a fuel ion undergoes a fusion reaction (about 10^7 metres). Similarly the electron cyclotron frequency is hundreds of GHz, whereas the electrons need to be confined for many seconds. [more]

- o ITER-8: Stabilizing the dynamics and concentration of attention could be considered a typical challenge encountered by any student, by the chairperson of any meeting, or by a facilitator called upon to enhance performance in this respect. The challenge is most evident when the concern is some form of creativity -- especially when required over a length of time (eg an artist's "muse"). Many tricks are explored to this end. The disciplines of concentration are however developed to a much higher degree by meditators. It is from those disciplines that parallels are sought with the reconciliation, within the same coherent cognitive framework, of the small scale "gyrations" and the large-scale effects necessary for the emergence of insight within ITER-8. The concern of ITER-8 is to recognize the significance of field effects ("gyrations", toroidal movement, etc) in terms of self-referential relationships, semantic relationships and feedback loops between cognitive domains. In this sense there is a fruitful parallel between the understanding of ITER's magnetic domains and the cognitive domains and attractors of ITER-8. Especially interesting is the manner in which certain attitudes, identified in sets of precepts (such as the [Eightfold Way](#)), may destabilize the dynamics when the attitudes are poorly (or "sinfully") held (cf [Towards a logico-mathematical formalization of "sin": fundamental memetic organization of faith-based governance strategies](#), 2004)
- **Necessary stabilizing "twist"**:
 - o ITER: Magnetic field configurations, now considered to have potential for controlled fusion, have a set of nested magnetic flux surfaces with twisted field lines produced by a combination of magnetic fields. The twist into a figure-of-eight shape necessary to reduce loss. The twist ensures that when a particle orbits the tube, it spends half the time on the inside of the tube and half on the outside -- thus equalizing the forces to some degree, so that the particle experiences a much smaller overall drifting force. In the case of the tokamak the toroidal magnetic field (parallel to the torus "tube") is produced by external coils (equivalent to a circular solenoid around the "tube"). The slightly weaker field necessary to twist those field lines is produced by a current flowing through the plasma itself (along the "tube") induced by a transformer coil. [more]
 - o ITER-8: The need for a stabilizing twist is also evident in the structure of DNA. The challenge in the case of ITER-8 is to determine the nature of the cognitive twist necessary to stabilize the dynamics of attentive concentration. In part this can be understood in terms of the counter-intuitive twist, modelled by the Möbius strip, necessary to the interrelationship of seemingly incommensurable categories. (cf [Engaging with Questions of Higher Order: cognitive vigilance required for higher degrees of twistedness](#), 2004)
- **Fusion process**: The challenge and potential outcome of combining seemingly incompatible elements is a preoccupation in both cases:
 - o ITER: Comprehending and enabling the core process of the fusion of the simplest (or most fundamental) distinct (if not "incompatible") atomic nuclei in an ionized state (as described above) is the prime concern of ITER. Such light nuclei fuse reluctantly because of their electrostatic repulsion. The challenge is to get them within the short range of the attractive nuclear forces to overcome that long-range repulsion.
 - o ITER-8: The corresponding challenge for ITER-8 is associated with the process whereby the simplest (or most fundamental) distinct concepts are forced into a form of union with each other. This may be briefly described by the challenge of fusion of "subject" and "object", of "knower" and "known". These are however analogues to the challenge of combining other apparently incommensurable concepts, as in polarized thinking (***). This is exemplified by the "[clash of civilizations](#)", the "[two culture](#)" challenge of "science" and "humanities", or any form of "unified" knowledge. More symbolically, the ITER challenge of fusing ions having the smallest number of distinct protons and neutrons, is paralleled by the challenge for ITER-8 of fusing psychosocial archetypes intimately associated with the smallest numbers: one, two and three.

Perhaps more superficially, but certainly more comprehensibly, is the degree to which fusing any such "fun-da-mental" cognitive elements is paralleled by the engendered spirit of "fun" in a creative, transformative moment through which incongruity is meaningfully juxtaposed. This suggests the need to reframe the significance of "light-weight" with which humour may be condemned by intellectual "heavy-weights". The energizing role of humour, in conditions of deprivation that conventional approaches to energy are totally unable to alleviate, should not be forgotten. (cf [Humour and Play-Fullness: essential integrative processes in governance, religion and transdisciplinarity](#), 2005)
- **Sustaining the process**: Beyond any particular moment of fusion, there is value in both cases in sustaining the process:
 - o ITER: here the focus is on achieving a self-sustaining "burning plasma" mode, as described above. However, as envisaged in its experimental mode, ITER will not seek continuous operation, limiting itself to 500 seconds or longer during each "shot" of the fusion experiment, with a repetition period of up to 2000 seconds.
 - o ITER-8: from the perspective of ITER-8 there are a number of ways, or metaphors, through which sustaining the process of cognitive fusion has been envisaged:
 - sustaining the "flow experience", as noted above
 - sustaining creative experience, and the challenge of "being abandoned by a muse"
 - cycles of reincarnation and rebirth, suggesting that these might usefully be mapped onto a torus, especially given recognition of the desirability of escaping the "[wheel of life](#)" (and death)
 - concern with immortality in relation to circulation of energy (as extensively explored in Taoist practice) [more]
 - the challenge of sustaining drug-enabled peak experiences

- sustaining meditative experience

These all raise questions about the period of fusion required to sustain or transform the cognitive fusion process.

- **Self-reflexive maintenance:** Both initiatives call for a high order of attention to their processes and the conditions of the container in which they take place.
 - ITER: the reactor vessel to be built requires immediate human monitoring for intactness and quality of the reactor wall's surface, as well as means for observation during operation in an emergency situation. This calls for sophisticated imaging technology [[more](#)]
 - ITER-8: as a process dependent to a high degree on imaginal transformation, a high order of self-reflexiveness is required to maintain the cognitive container (as an "[alchemical vessel](#)" or *athanor*) and guard against its deterioration and degradation. (cf David Peat, *The Alchemy of Love*, 2003)
- **Channelling the outcome:** Ensuring that energy released in each case is appropriately "captured" and channelled is common to both:
 - ITER: the concern here is the conversion of the high levels of energy into power that can be used outside the confines of the ITER installation and processes
 - ITER-8: the concern here is communicating insight, achieved under circumstances that may be framed as "ideal" but "subjective" through an appropriate process accessible to those who need most to benefit from it
- **"Stepping down":** In both cases the energy tends to be in a form that requires its further transformation before it can be effectively used:
 - ITER: here the concern is the interface (through transformers) with the conventional power grid through which energy is distributed
 - ITER-8: here the concern is the interface with the communication systems and processes through which new insight tends to be disseminated. Of particular interest in future is the interface with the applications supportive of the semantic web of the emerging knowledge society and with any forms of artificial intelligence associated with a "global brain"(cf *Simulating a Global Brain: using networks of international organizations, world problems, strategies, and values*, 2001)

It may be argued that the total financial investment in fusion reactor processes far exceeds that in the complementary processes of concern to ITER-8, and that therefore the understanding of the principles and operational considerations from an ITER-8 perspective are of insignificant relevance. This argument unfortunately avoids any recognition of the millions of people, in a wide range of cultures, that have experimented in various ways with "cognitive fusion" over hundreds, if not thousands, of years.

The question for ITER is whether its advocates are totally confident that their design principles do not conceal fundamental flaws -- possibly known in other terms in other frameworks -- that may well result in disaster. The implications of the blinkered arrogance of the designers and operators of *RMS Titanic*, and of the reactors at Chernobyl and Three Mile Island, should not be forgotten. It should also be recognized, that given its contrasting nature, the potential outcomes from ITER-8, in response to the energy needs of millions, are likely to emerge before construction of ITER is completed in 2016 (if the priorities of the international community do not change radically over that period).

ITER-8 self-reflexive design

The enaction process through which ITER-8 is designed, given form and activated, can perhaps be usefully described in terms of the interplay of the following cognitive "devices":

- **Isomorphic design:** ITER-8 is designed according to the principle of form follows function.

The design seeks to resonate with the cognitive preoccupations of its processes and those of the environment with which it engages.

- **Image cultivation:** ITER-8 operates to a significant degree in the imaginal world, namely in the world of how perceptions are formed and cultivated -- now partly acknowledged by the disciplines of image marketing, management and "spin". This imaginal dimension is to be distinguished from pure fantasy as an intermediary between the sensible world and the intelligible world. It is the domain of imaginative knowledge conditioning hopes and fears. ITER-8 cultivates this domain, and its imaginative cultural resonances, in the spirit indicated by [Hermann Hesse](#) (*Magister Ludi*, 1943) and as a means of sustaining creative imagination and belief. In this sense ITER-8 both engenders strange attractors and is one in its own right. Such attractors are seen as vital to the psychocultural health of a society increasingly prone to depression -- however it is induced.
 - Manhattan project of the imagination ****
 - open imagination
- **Aesthetic resonances:** Although attaching full significance to the scientific worldview out of which ITER is born, ITER-8 recognizes the role of the arts and humanities, especially music, in cultivating integrative resonances between otherwise fragmented perceptions of the psychosocial world -- about which science typically has little fruitful to say to those subject to them. ITER-8 elicits such bridging understandings in the spirit promoted by such bodies the MIT [Center for Advanced Visual Studies](#), founded by [Gyorgy Kepes](#), in the expectation that they may prove vital to the governance of the future (cf *Aesthetics of Governance in the Year 2490*, 1990; Franz Josef Radermacher and Solvig Wehsener, *The Globalization Saga: balance or destruction*, 2001; *Knowledge Gardening through Music: patterns of coherence for future African management as an alternative to Project Logic*, 2000)

- **Knowledge organization:** ITER-8 is a process of knowledge organization and management. Recognizing the fundamental role of thesauri and ontologies in the cognitive and epistemological challenges of the future, it seeks to move beyond the constraints of conventional uses of such tools through the use of richer mathematical and logical tools. *** syllogisms, semantic web,
- **Mathematical dimensions:** Given that mathematics is the pre-eminent science of relationships, in a particular sense ITER-8 may be understood as an evolving mathematical object with a particular emphasis on holistic and global frameworks and their relationship to particular local perspectives. Mathematics is understood as a method of bridging between incommensurable perspectives, for example the use of the mathematical theory of correspondences to enhance comprehension of the centuries old [theory of correspondences](#) central to symbolism (cf Erwin Klein and Anthony C. Thompson, *Theory of Correspondences*, 1984).
- **Ludic processes:** In addition to the aesthetic influence on its design, the psychosocial integrity of ITER-8 is also ensured in important ways by a ludic mentality (cf [Johan Huizinga](#), *Homo Ludens*, 1938). As with a number of strategically focused initiatives, game-playing is fundamental to the processes of its development. Humour is similarly seen as vital to ensuring integration across disparate and often highly conflictual domains. In optimizing its role as an attractor, fun is seen as fundamental -- and is taken very seriously (cf *Humour and Play-Fullness: essential integrative processes in governance, religion and transdisciplinarity*, 2005)
- **Contextual engagement:** As noted above, ITER-8 is not designed to engage through conventional relationships with other entities. Its focus is on enactive "arm's length" relationships dependent on field effects. This necessary detachment is seen as essential to avoid:
 - institutional quenching, typical of project logic procedures designed to enhance boredom, delay and tokenism in the interests of the self-selected few
 - individual quenching,
 - imaginative quenching,

Such detachment is also designed to avoid recuperation typical of project game-playing. The nature of the engagement with particular entities is discussed further below.

- **Energy dimensions:** As noted above, the focus of ITER-8 is on the range of psychosocial energies fundamental to creativity, imagination and any sense of quality of life (cf *Reframing Sustainable Sources of Energy for the Future: the vital role of psychosocial variants*, 2006). These are to be contrasted with the increasing "energy" of apathy and despair (cf *Global Civilization of Vampires: Governance through Demons and Vampires on Spin?*, 2005). Just as a distinction can be made between the conventional energy sources of "natural" (solar, etc), fuel, nuclear fission, nuclear fusion, a similar distinction can be usefully made between psychosocial energy derived from: happenings (carnivals, etc), destructive exploitation of cultural products (eg ecotourism), destructive exploitation of values, and creativity. The Chinese understanding and disciplines associated with *ch'i* energy are necessarily integrated into ITER-8 approaches (cf R G H Siu, *Ch'i: a neo- taoist approach to life*, 1974). The process of disciplining imagination, with appropriate detachment, is understood as the means of avoiding quenching psychosocial energy to enable such energy to be engendered.
- **Metaphors:** ITER-8 seeks to benefit from any metaphors capable of enhancing its capacity to engender psychosocial energy sustainably -- drawing on any discipline that can help achieve and sustain the balance required for "cognitive fusion" to occur.

Of particular interest are those metaphors which are to some degree self-referential of the cognitive process -- transcending the polarization between knower and known. Various forms of metaphor are indicative:

- technical (electromagnetic): coils, electricity, capacitors, resistances, conductors
 - technical (hydrodynamic)
 - technical (containers): incubator
 - music: iterative, rounds, instrument playing
 - cultural metaphors (cf Susantha Goonatilake, *Toward a Global Science: mining civilizational knowledge*, 1999; *Enhancing the Quality of Knowing through Integration of East-West metaphors*, 2000)
 - traditional "technologies": *kundalini* cycling through *chakras*, alchemical vessels
 - innovative zones (cf *Renaissance Zones: experimenting with the intentional significance of the Damanhur community*, 2003)
- **Self-reflexiveness / structure:** Several approaches to self-reflexivity are emphasized:
 - the arguments, noted above, associated with enactivism as promoted by [Francisco Varela](#) and others ("laying down the path through walking", etc)
 - recognition of fractal whole-in-part descriptions, notably in the light of the Mandelbrot set (cf *Sustainability through the Dynamics of Strategic Dilemmas: in the light of the coherence and visual form of the Mandelbrot set*, 2005)
 - communication issues relating to closure, form and medium in so far as assumptions are made regarding the adequacy of ex-planations formulated on a planar surface that might be more meaningful on a form such as a torus (cf [G. Spencer Brown](#), *Laws of Form*, 1969; [Hilary Lawson](#), *Closure: a story of everything*, 2001; Michael Schiltz, *Form and Medium: a mathematical reconstruction, Image [&] Narrative*, 6, 2003)

Torus dynamics common to ITER and ITER-8

This topic is extensively explored in a separate paper (*Comprehension of Requisite Variety for Sustainable Psychosocial Dynamics: Transforming a matrix classification onto intertwined tori*, 2006)

Introduction

From matrix to torus

Systemic sub-systems vs Preferred modes: "Columns" vs "Rows"

Generic matrix

Distribution of significance on torus surface

Interlocking tori: combining the two alternative representations

Dynamics of interlocked tori

Distribution of significance "within" a torus: using a third dimension for "Engagement with reality"

Contiguity of paired circular cross-sections

"Empty" centres and four-dimensionality

Psychosocial relevance of torus-related dynamics

Coherence, instability and failure of psychosocial systems

Resonant associations and comprehension of feedback vital to sustainability

Beyond the plane: form and medium in terms of the calculus of indications

Resonant association of psychosocial identity with intertwined tori

Memorability: musical clues to psychosocial system sustainability

Possible immediate applications of relevance to sustainability

Choosing the dimensionality of living

Potentially problematic consequences

References



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